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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 14

Application Number: 09/172,389
Filing Date: October 14, 1998
Appellant(s): LARSON, RONALD D.

Robert A. Blaha
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/09/01.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

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(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,579,455	Greene et al.	11-1996
5,600,763	Greene et al.	2-1997
6,088,035	Sudarsky et al.	7-2000

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. Claims 1, 4-7, 9-11, 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al. (5,579,455) in view of Sudarsky et al. (6,088,035).

Claims 1, 11 and 18, Greene et al. discloses creating a Z pyramid data structure (col. 5, lines 51-52), the z pyramid data structure comprising at least first and second levels, each level comprising a plurality of regions (col. 5, lines 51-65), each region comprising subregions (col. 26, lines 38-39), each subregion corresponding to a single Z value (col. 26, lines 39-45), each region corresponding to a plurality of Z values of the region, wherein each subregion in the second level has a Z value that corresponds to a maximum Z value of a subregions in the first level (col. 26, lines 47-51), the logic comparing the minimum Z value of each primitive with the Z value of a region associated with the tested primitive to determine whether or not the tested primitive is fully occluded (col. 26, lines 61-67); if the tested primitive is not fully occluded, the logic determine whether or not any subregion of the region associated with the tested primitive is fully covered by the primitive, wherein if a subregion is fully covered by the tested primitive, then the logic determines whether or not the Z value of the covered subregion needs to be replaced with the maximum Z value of the tested primitive (col. 19, lines 44-49, fig. 12); the logic to determine whether the Z value of the covered subregion needs to be replaced with the maximum Z value of the tested primitive, the logic determines whether the maximum Z value of the tested primitive is less than the Z value (nearer than the current depth value) for the covered subregion, if the maximum Z value is less than the Z value for the covered subregion, then the Z value for the covered subregion is replaced with the maximum Z value (col. 19, lines 50-53); further, Sudarsky discloses updating the potentially visible dynamic object list as previously hidden dynamic objects become visible and hidden. It would have been obvious to one

of ordinary skill in the art to incorporate the Sudarsky's teaching into Greene's method for updating the occluded dynamic object during the time period (on the fly), providing an improved method for displaying graphics models which adapts visibility culling algorithms to dynamic scenes, and also minimizes the update overhead of the model that may be potentially visible to the user.

Claims 4 and 14, Greene et al. discloses the logic maintains a coverage mask for each level Z pyramid data structure, each coverage mask comprising a bit for each subregion of the level Z pyramid dada associated with the coverage mask, wherein the logic determines that the maximum Z value of the primitive is less than the value (nearer than the nearest depth) for the covered subregion, a bit in the coverage mask associated with the covered subregion is set (col. 17, lines 26-32).

Claims 5 and 15, Greene et al. discloses all coverage mask bits corresponding to the subregions of a particular region have been set in the coverage mask associated with the first level of the Z pyramid data, a bit is set for the corresponding region in the coverage mask associated with the second level in the Z pyramid data (col. 18, lines 9-19)

Claims 6 and 16, Greene et al. discloses the bits in the coverage mask have been set for a particular region in the coverage mask, the logic replaces the maximum Z value for the particular region with the maximum Z value of the subregions associated with the particular region (fig. 19A).

Claims 7 and 17, Greene et al. discloses the logic sets the corresponding bit in the coverage mask for a next level up in the Z pyramid (col. 10, lines 8-67).

Claim 9, Green et al. discloses the tiler being in communication with a Z pyramid memory element, the Z pyramid memory storing the Z pyramid data (col. 28, lines 1-24).

Claim 10, Greene et al. discloses the Z pyramid memory is periodically updated with the pixel Z values corresponding to Z values of primitives which have been scan converted into screen coordinates, wherein the pixel level Z are used by the tiler (quadrant) to periodically reconstruct the Z pyramid data (col. 5, line 60 through col. 6, line 36).

2. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al. (5,579,455) in view of Sudarsky et al. (6,088,035) and further in view of Greene et al. (5,600,763).

Claim 8, Greene et al. (5,600,763) discloses the primitive are occlusion tested in a tiler component of the graphics wherein the Z pyramid data is updated by the tiler on the fly as primitives are being processed through the graphics system (col. 6, lines 29-40). It would have been obvious to one ordinary skill in the art to include a "tiling pass" as taught by Greene, because tiling pass (very rapidly) has culled most of the hidden polygons it could improve in updating or inserting the remaining polygons into the quadtree (Z pyramid).

(11) Response to Argument

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case both Greene et al. and Sudarsky show limitations of the claimed invention; Greene's teachings alone show the limitations of the claimed invention, the reasons for using the combination of Sudarsky's teaching into Greene's method to modify the feature of updating the occluded dynamic object during the time period, because in the Sudarsky's reference, the method of using updating z-pyramid has been shown in the background or prior art of the invention (col. 3, lines 56-67) and the method of updating z-pyramid has been improved in updating the potentially visible dynamic object for primitive occlusion testing and rendering or updating the occluded dynamic object during the time period; therefore, the rejection in the present instance is proper.

With respect to claims 1, 11 and 18, applicant states that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (the z pyramid data can be updated on the fly and can be periodically updated with pixel level z values to ensure accurate occlusion testing, and updating z pyramid to be reconstructed prior to scan conversion) are not recited in the rejected claims 1, 11 and 18. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, as explained in the Office Action, Greene et al. disclose if the z max value is less than the z value for the

subregion, then the z value for the subregion is replaced with the z max (col. 19, lines 50-53). Therefore, the rejection is proper.

Claims 4-7 as explained in the Final Office Action and also in this Office Action (see above). Therefore, the rejection is proper.

Claim 8, Greene discloses this feature in fig. 2C shows occlusion testing in a tiler component, further, claim 8 inherits the limitations of claim 1 for showing updating z on the fly (during the time period) as taught by Sudarsky and rendering an obviousness to one of ordinary skill in the art at the time the invention was made. Therefore, the rejection is proper.

Claims 9 and 10, Greene shows limitations of the claimed invention as explained in the Final Office Action and also in this Office Action. Therefore, the rejection is proper.

Claims 14-17, the relied upon reference show all features of the claimed invention; therefore, the rejection is proper.

Claim 18, the examiner considers similarly as claims 1 and 11, because the teachings of Greene and Sudarsky perform the identification function specified in the claim in substantially the same way, and produce substantially the same results as the corresponding element disclosed in the specification. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention to substitute applicant's structure, material, or acts for that described in the prior art reference, because Greene and Sudarsky show occlusion testing primitives being processed in a graphics system and updating a z pyramid for occlusion test during the time period.

Furthermore, the specification does not describe adequate structure, material or acts for performing the recited function.

In summary, the combination of Greene and Sudarksky meet the limitations in claims 1, 4-11 and 14-18 and the rejection based on the applied prior art is seen proper.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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December 13, 2001

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